

Patent claims

1. A method for the manufacture of an electric motor, particularly a spindle motor for a hard disk drive, comprising a stator (15), a rotor (11) and a hydrodynamic bearing arrangement (13) which rotatably supports the rotor (11) with respect to the stator (15), characterized in that the hydrodynamic bearing arrangement (13) is prefabricated and fixedly mounted onto the stator (15) or the rotor (11) in a prefabricated state.
2. A method according to claim 1, characterized in that the hydrodynamic bearing arrangement has a bearing sleeve (37) having at least one bearing surface (38) in which a groove pattern (40) to create a hydrodynamic radial bearing is formed before it is mounted onto the stator (15) or the rotor (11) of the spindle motor (3).
3. A method according to claim 1 or 2, characterized in that the hydrodynamic bearing arrangement has a counter disk (41) which seals the bearing sleeve (37) at one end, and an axial ring (47) which is mounted onto the shaft (35), a hydrodynamic axial bearing being formed between the counter disk (41) and the axial ring (47).
4. A method according to one of the above claims, characterized in that the prefabricated bearing arrangement (13) is bonded to the stator (15) or the rotor (11).
5. A method according to claim 4, characterized in that an adhesive with low gas emission properties is used.
6. A method according to one of the above claims, characterized in that a transition fit is provided at a fixed assembly section between the bearing arrangement (13) and the stator (15) or the rotor (11).

7. A method according to one of the above claims, characterized in that the bearing arrangement (13) is tested for its full functionality before assembly.
8. A method according to claim 2, characterized in that a shaft (35) is inserted into the prefabricated bearing sleeve (37) before it is mounted onto the stator (15) or the rotor (11).
9. A method according to one of the above claims, characterized in that the bearing arrangement (13) is fixedly mounted onto the stator (15) which particularly forms a part of a baseplate (21) of a hard disk drive.
10. A method according to claim 8 or 9, characterized in that a hub (31) of the rotor (11) is fixedly connected to the shaft (35) which is accommodated in the bearing arrangement (13) for its hydrodynamic support, with a unit consisting of rotor hub (31), shaft (35) and bearing sleeve (37) then being mounted with respect to the stator (15).
11. A spindle motor for a hard disk drive comprising a rotor (11), a stator (15) and a hydrodynamic bearing arrangement (13) that rotatably supports the rotor (11) with respect to the stator (15), characterized in that the hydrodynamic bearing arrangement (13) is fixedly bonded to the rotor (11) or the stator (15).
12. A spindle motor according to claim 11, characterized in that the bearing arrangement (13) includes a bearing sleeve (37) to whose outer surface the stator (15) or the rotor (11) is firmly fixed.
13. A spindle motor according to claim 12, characterized in that the bearing sleeve (37) has an inner bearing surface (38) in which a groove pattern is formed to create a hydrodynamic radial bearing.

14. A spindle motor according to claim 12 or 13, characterized in that the hydrodynamic bearing arrangement has a counter disk (41), which seals the bearing sleeve (37) at one end, and an axial ring (47) that is mounted onto the shaft (35), a hydrodynamic axial bearing being formed between the counter disk (41) and the axial ring (47).
15. A spindle motor according to claim 12, 13 or 14, characterized in that the bearing arrangement includes a shaft (35) rotatably supported in the bearing sleeve (37), which is inserted into the bearing sleeve (27) before the bearing arrangement is mounted onto the stator (15) or the rotor (11).
16. A spindle motor according to one of the claims 11 to 15, characterized in that a transition fit is provided between the bearing arrangement (13) and the stator (15) or the rotor (11).
17. A spindle motor according to one of the claims 11 to 16, characterized in that a groove (55) is provided on at least one of the bonded contact surfaces of either the bearing arrangement (13) or the stator (15) or the rotor (11).
18. A hard disk drive having a spindle motor according to one of the claims 11 to 17.
19. A hydrodynamic bearing arrangement for an electric motor, particularly for a spindle motor for a hard disk drive, comprising a stator (15), a rotor (11) and the hydrodynamic bearing arrangement (13), which rotatably supports the rotor with respect to the stator, characterized in that the hydrodynamic bearing arrangement (13) includes a hydrodynamic radial bearing and a hydrodynamic axial bearing and forms a fully functional unit that can be mounted onto the stator (15) or the rotor (11).
20. A hydrodynamic bearing arrangement according to claim 19, characterized in that it has a bearing sleeve (37) having a bearing surface (38) on which a groove pattern (40) is formed to create the hydrodynamic radial bearing.

21. A hydrodynamic bearing arrangement according to claim 19 or 20, characterized in that the hydrodynamic bearing arrangement has a counter disk (41), which seals the bearing sleeve (37) at one end, and an axial ring (47) that is mounted onto the shaft (35), a hydrodynamic axial bearing being formed between the counter disk (41) and the axial ring (47).